TRANSCRIPT: Chemistry & Corpses: The Science of Bog Bodies
(in case you can't watch the video on slide 26)

On May 6, 1950, two Danish brothers digging for peat in a local bog unearthed a murder victim. Based on the condition of the body, they figured the crime had happened recently, so they called the police. But there was nothing the authorities could do because the man's murders — and the man — had both died like 2200 years ago.

Today he's known as Tollund Man, and thanks to the amazing chemistry of bogs, this naturally mummified person from the Iron Age is considered one of the best preserved prehistoric bodies in the world.

Bogs are found throughout the world, but the low-oxygen, highly-acidic bogs of northern Europe have proven to be ideal for preserving ancient humans, animals, and even butter. For more than 150 years, hundreds of bog bodies have been uncovered in Denmark, Ireland, Germany and the Netherlands -- many of which still have their internal organs intact. Tollund Man may be the best preserved of them, but he's far from the oldest. In 2011, a peat farmer in Ireland unearthed a body dated to about 4,000 years ago, making him the world's oldest human specimen with intact skin.

So how exactly do bogs do their preservation magic? Let's start by looking at how they form, over thousands of years: A bog begins with lots of moss, particularly a type known as Sphagnum, growing in wet, low-lying areas. Sphagnum absorbs lots of nutrients from the soil, especially ions of magnesium and calcium, which make the soil highly acidic. And even though there's lots of water around, it doesn't circulate, which means there's no oxygen dissolving and flowing around. That's bad news for bacteria, which can't survive in an acidic, anaerobic environment. And that means that nothing is around to break down the dead moss and other vegetation. In other words, decomposition can't happen. What's left over time is undecomposed mush that piles up, known as peat. Moss continues to grow on top of those piles, and the layers of peat accumulate. Bogs form when the peat builds up faster than any decomposition can occur.

In bog-rich countries, peat is often farmed for use as soil conditioner, fuel, even animal bedding. So ancient specimens in bogs are generally found -- and sadly, often destroyed -- by farm equipment. Scientists are still learning about the chemical processes that take place in those bogs over hundreds and thousands of years. We know, for example, that tannins produced by the moss can be as acidic as vinegar -- which can basically turn skin into leather.

But one of the strangest properties of bog bodies is that, while skin, hair, and organs may all be preserved, the acidic mixture often dissolves calcium phosphate in the bones, leaving a body without a skeleton. pH levels vary from bog to bog, though, which means some bodies may be more or less preserved than others.

So here's another question: What are those bodies doing there in the first place?!

Archeologists think ancient Celtic tribes used bogs for religious ceremonies, including dedications and, yes, sacrifices. Some bodies appear to have been tortured -- discovered with nooses around their necks, others with holes in their skulls. One body revealed entrails partially pulled out through incisions. Some archeologists have linked this kind of behavior to Iron Age paganism. Tollund Man was found with a leather noose around his neck, and an autopsy revealed that he died from hanging. While nearly everyone who died in Denmark at that time was cremated, it turns out that those who were sacrificed were buried in bogs.

Finally, not all uses of ancient bogs were so gruesome. Hundreds of large packages of butter and lard have been discovered in bogs, where they were buried to keep them from going rancid.

The question is: would it still be good on my toast?

I'm waiting for science to answer me that question, but in the meantime: Thanks for watching this SciShow Dose -- especially our Subbable subscribers. To learn how you can support us, just go to Subbable.com/scishow. If you have questions, you can find us on Facebook and Twitter and as always in the comments below, and if you want to keep getting smarter with us, just go to YouTube.com/scishow and subscribe!